AChor/MBF3C   **Name:** _____
                                                   Date: _____

<p style="text-align:center"><u>**Practice Test 8: One-Variable Statistics**</u></p>

K: _____	C: _____	A: _____	T: _____

PART A: Multiple Choice Questions (Knowledge)
Instructions: Circle the English letter of the best answer. <u>Circle</u> one and ONLY one answer.

1. The mean value of a set of data is found by:

(a) adding the values and dividing by the number of values in the set
(b) putting the values in order and finding the one located in the middle
(c) finding the value that occurs most often
(d) subtracting the least value from the greatest value
(e) adding the squares of the difference between each value and the mean, and dividing by the number of values in the set

2. Any survey that asks people to return their completed questionnaires by mail is subject to:

(a) response bias   (b) non-response bias   (c) measurement bias   (d) sampling bias   (e) no bias

3. A population is split into groups. Members of each group are selected randomly in proportion to their number in the population. The sampling technique used was:

(a) cluster   (b) systematic   (c) stratified random   (d) simple random   (e) convenience

4. Which of the statements is not true?

(a) A sample could be biased if it is too small.
(b) A sample could be biased if it is based on one gender.
(c) A sample could be biased if it is based on one age group.
(d) A sample could be biased if it is not randomly drawn.
(e) A sample could be biased if it is too large.

5. A TV station wants to estimate the popular support for each of the candidates in an upcoming election. Which procedure would be most appropriate for obtaining a statistically unbiased sample?

(a) interviewing the presidents of labour unions about their members' opinions
(b) inviting all viewers to participate in a mail-in poll
(c) calling a random sample selected from a list of eligible voters
(d) setting up a booth in the local shopping mall and interviewing every tenth person that passes by
(e) calling a random sample selected from a local area phone book

6. Which type of graph best shows how a typical grade 11 student spends his or her allowance?

(a) bar graph   (b) circle graph   (c) histogram   (d) pictograph   (e) line graph

7. The high and low temperatures (°C) in Toronto for a week are as follows:

(23, 15), (22, 17) (29, 19), (19, 15), (21, 11), (20, 17), (21, 18)

Which of the following is the best way to organize and display the data?

(a) bar graph   (b) circle graph   (c) histogram   (d) pictograph   (e) line graph

8. Ted wrote five tests for French. His percent scores are 87%, 67%, 76%, 76%, and 94%. Find the mean for his five tests.

(a) 76   (b) 80   (c) 84   (d) 94   (e) none of the above

9. What type of distribution is represented by this graph?

(a) normal

(b) skewed right

(c) skewed left

(d) bimodal

(e) abnormal
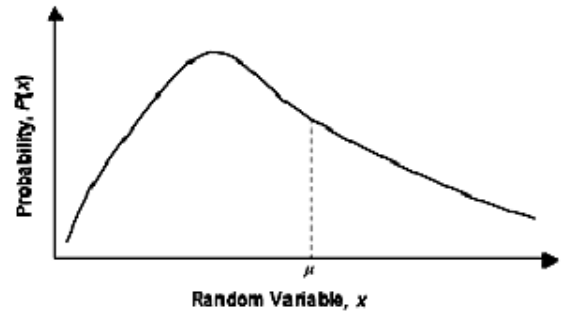
Part B: Matching **(Knowledge)**
Match the most appropriate terms on the left to the statements on the right.

1. Standard Deviation   _____ three values that divide a set of data into four intervals with equal number of data

2. Variance   _____ data collected by the researcher for his/her own use

3. Quartiles   _____ data that are distinct and can be counted

4. Primary Data   _____ square root of the variance

5. Interquartile Range   _____ data that can have any numerical value within a given interval

6. Continuous Data   _____ a measure of how spread out the values in a set of data are from the mean

7. Discrete Data   _____ difference between the greatest and least values in a set of data

8. Range   _____ measures how closely data clusters around the median

Part C: Full Solution Questions
Instructions: Show all steps for full mark. Marks will be deducted for poor or improper form.
Provide answer statements in <u>complete</u> English sentences where applicable.

Knowledge:

1. In each situation, identify the sampling technique. [K: 3]

(a) Kevin went to the local music store to ask what people thought of the "Canadian Idol" winner's debut CD.

(b) The school council has set up a booth at the front of the school on Parents' Night to ask about changing the school uniform.

(c) Sherry asks 20 girls and 20 boys on the school sports teams if the sports council should spend the fundraising money on new football equipment.

2. Classify the data as coming from a primary or a secondary source. [K: 4]

(a) a survey of your friends

(b) an Internet search to find information

(c) a phone poll conducted by a radio station

(d) data given to you that a friend collected

3. Identify the type of bias (sampling, response, non-response, and measurement) in each survey.   [K: 4]

(a) A survey to determine the effectiveness of a government's social services is conducted at a homeless shelter.

(b) A survey sent via the Internet asks people to answer a questionnaire and email it to a central processing station.

(c) When asked to circle their favourite candidate in the student council, the choices were:

The President
The secretary
The treasurer
Other: _____

(d) When asked about how the current transit system could be improved, one of the questions worded:

The government has been underfunding our transit system for years. Should we turn to private-sector investment to finally solve our transit problems?

4. Find the mean, the median, and the mode for each set of data, to 2 decimal places.   [K: 5, 4]

(a) 21, 45, 53, 47, 82, 21, 64, 77, 54, 92, 91, 72   (b)

Number of Flips	Frequency
2	23
3	11
4	6
5	4
6	1

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Communication:

5. Randy decides to hand out a survey to every fifth person entering the school. He asks them to fill out and hand it in at the office when they are done.

(a) What type of sampling technique is Randy using? Explain. [C: 2]

(b) How could this sampling technique lead to inaccurate results? [C: 2]

6. Renee plans to survey 100 people. Describe how Renee can choose a stratified sample if her survey population contains 1200 people, and 60% are female. [C: 4]

7. The histogram shows the test scores, in percent, of a grade 11 mathematics class.

(a) How many students got at least 90% on the test? [C: 1]

(b) Explain why test scores can be displayed in a histogram. [C: 1]

Test Scores
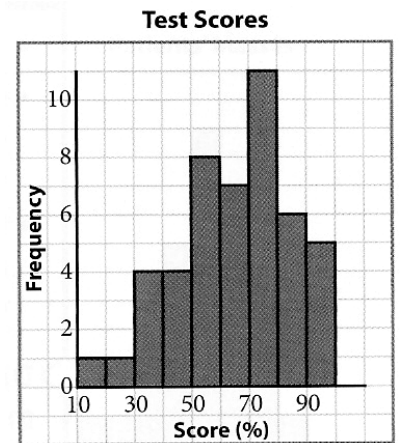
(c) Identify the type of distribution. [C: 1]

Application:

8. Find the range, the variance, and the standard deviation for the given set of data, to 2 decimal places.

    28, 51, 91, 47, 56, 77, 64, 52, 71, 63   [A: 8]

9. A manufacturer of rechargeable batteries tests 10 batteries at random and records the time it takes, in minutes, to drain each battery after a full charge has been applied.

    195, 203, 177, 186, 191, 225, 216, 202, 197, 218

    Find the range, the variance, and the standard deviation of the data, to 2 decimal places. [A: 8]

Thinking:

10. The table shows the results of a test out of 100. Do the data appear to be normally distributed? Explain.   [T: 3]

Mark Interval	Tally	Frequency
[30–40)	I	
[40–50)	IIII	
[50–60)	HHH I	
[60–70)	HHH HHH	
[70–80)	HHH II	
[80–90)	III	
[90–100]	I	

11. A large doughnut chain recorded the opening week sales for eight new shops:

$37 500, $42 300, $58 000, $31 300, $41 800, $37 100, $63 200, $58 000

Are sales at the new shops likely to increase or decrease after the opening week? Explain.   [T: 3]

12. If you were the general manager for an NBA basketball team, would you prefer a larger or smaller standard deviation for player heights on your team? Explain.   [T: 2]

Answers:

Part A: **1.** a; **2.** b; **3.** c; **4.** e; **5.** c; **6.** b; **7.** a; **8.** b; **9.** c.   **Part B:** 3, 4, 7, 1, 6, 2, 8, 5

Part C:
1. (a) convenience sampling; since this location will have a quantity of people who understand the questions and are interested in answering them, (b) voluntary-response sampling; since the booth will attract people who are interested in the issue, (c) stratified random sampling; since the school population has both boys and girls and the samples represent these subgroups proportionally; **2.** (a) primary, (b) primary or secondary, depending on the use of the information, (c) primary, (d) secondary; **3.** (a) sampling bias since the respondents are not representative of the total population, (b) non-response bias since many people ignore Internet/e-mail surveys, (c) measurement bias since one of the choices is more prominent than the others, (d) response bias since the question leads respondents to answer not according to their true beliefs; **4.** (a) mean = 59.92, median = 59, mode = 21,
(b) mean = 2.87, median = 2 (23rd entry), mode = 2; **5.** (a) systematic random sampling because every 5th person is asked to fill out a survey, (b) will have non-response bias because not everyone will return the survey;
6. 60% of 100 is 60. To keep the same female-to-male ratio as the population, she should survey 60 females and 40 males; **7.** (a) 5, (b) test score is continuous data, (c) skewed distribution to the right;
8. range = 63, variance = 275 (mean = 60), standard deviation = 16.58; **9.** range = 48 min, variance = 204.8 min (mean = 201), standard deviation = 14.31 min; **10.** Yes, the median, mean, and mode are all at the centre, and the graph would be almost symmetrically bell-shaped by looking at the tally column; **11.** They will likely decrease, since in the first week people go there because it is new. After that, they only go if they really enjoyed it;
12. smaller standard deviation if the distribution is skewed to the right, so the team would have team members who are tall and of almost the same height.